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Final Botanical Resource Specialist Report

Melvin Butte Vegetation Management Project

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Botanical Evaluation and Botany Report
for Sensitive, Survey and Manage, and Invasive Plant Species

Summary of Findings:

Sensitive Plants: No sensitive plant species or high probability potential habitat were found in the project area. However, six sites for whitebark pine, a Federal Candidate species, were found to be adjacent to the project area. There are no direct effects to whitebark pine under any alternative. There is a potential for indirect effects to whitebark pine from wildfire or mountain pine beetles. This potential is greatest with Alternative 1, and least in Alternative 2, followed by Alterative 3. The cumulative effects to whitebark pine in the analysis area are mixed. The project has beneficial effects for whitebark pine and does not add to a negative trend.

Survey and Manage Species: There are no expected direct, indirect or cumulative effects to Survey and Manage plant species under any alternative because no known populations or habitat were found in the project area.

Invasive Species: There is an increased risk of invasive plant introduction and spread under all Alternatives. This risk is highest in Alternative 2, followed by Alternative 3, and then Alternative 1. The project adds incrementally to the cumulative increase in invasive species risk from past practices, wildfire, and ongoing projects. Actions to reduce, but not eliminate this risk, are included in the project Design Criteria/Mitigations section of this document.

Introduction

This report documents consideration of Protected, Threatened, Endangered and Sensitive (TES), Survey and Manage, and Invasive plants related to the Melvin Butte Forest Management project. The intent of this analysis is to comply with existing regulations and management direction to protect and sustain Sensitive and Survey and Manage Plant species and prevent and manage invasive plant species on public lands.

Sensitive Plant Species

Regulatory Framework/Management Direction

This analysis is prepared in compliance with the Forest Service Manual (FSM) 2672.4, and the Endangered Species Act of 1973 (Subpart B; 402.12, section 7 consultation). Effects of the proposal are evaluated for those TES plant species on the current Regional Forester's Sensitive Species List (RFSS 2670/1950, December 9, 2011) (See Appendix A) for those species documented or suspected to occur on the Deschutes National Forest. The Deschutes National Forest Land and Resource Management Plan has a number of standards for sensitive plant species which apply (USFS, 1990).

Analysis Methods

Analysis of the project included a pre field review of existing information on sensitive plants and their habitats. Portions of the area have been surveyed over the past 20 years and new and existing information was used for spatial analysis using Geographic Information Systems (GIS). Potential habitat for several sensitive species was identified in the project area and it was surveyed in 2007.

The direct and indirect effects of the action alternatives are evaluated and the cumulative effects of the project, considered with other activities in the past or near future are also discussed.

Measures to be used in the effects analysis include probability of detrimental impacts to rare plant species in number of plants affected and acres of habitat lost or gained. Expected impacts from the project are based on professional knowledge and experience of similar projects in the past.

Pre-field Review

Information about the area was consulted. Site conditions indicated potential habitat in forested areas for four R6 sensitive vascular plant species: 1) Peck's penstemon, *Penstemon peckii, 2)* Tall, Agoseris *Agoseris elata,3)* the Green Tinged Paintbrush, *Castilleja chlorotica* and 4) whitebark pine, *Pinus albicaulis.* There was also potential habitat for the sensitive fungi, *Hygrophorus caeruleus.* See Appendix A.

Survey Results

The area was surveyed in the summer of 2007 and portions were reexamined in the fall 2011 and 2012 during fungi surveys. No sensitive species or high probability potential habitat were found in the project area. However, six sites for whitebark pine were found to be adjacent to the project area.

Existing Condition

The Melvin Project area is located on forested slopes northeast of the Three Sisters and Broken Top Cascade Mountains. The project area contains a gradation of plant habitats and associations tied to the elevation and precipitation gradient found between higher elevation moist mixed conifer forests to lower elevation dry mixed conifer and ponderosa pine forests. The area has only one stream, Three Creeks which is transitions from perennial to intermittent in the project area. No sensitive plant species or high probability potential habitat, or other special habitats were found in the project area.

One sensitive plant species, whitebark pine is located adjacent to the project area and could be indirectly affected by the project.

Whitebark pine- (*Pinus albicaulis)* is a five needle pine on the Regional Forester's Sensitive species list. Surveys for the species have been done across the forest and both permanent monitoring plots and select trees are identified and mapped. There are six sites for whitebark pine adjacent to the project area ranging at distances from 333 to 666 feet south of the boundary.

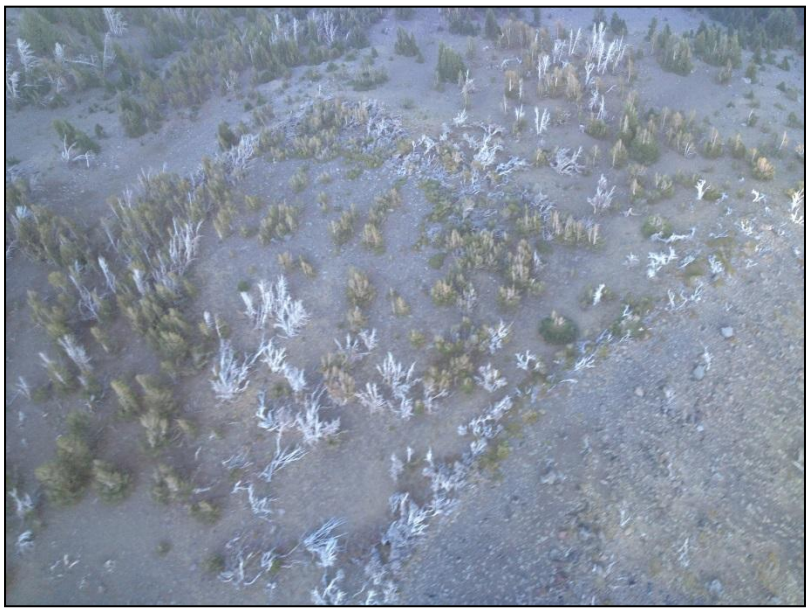

Figure 1 The white Skelton's are dead whitebark pine in the Three Sisters Wilderness, approximately 4 miles west of the project area.

Whitebark pine are found in subalpine and timberline areas. They are in decline across most of their range in North America because of the combined effects of mountain pine beetle outbreaks, wildfires and fire exclusion, environmental effects from climate change and the exotic pathogen, *Cronartium ribicola*, which infects five-needle white pines and causes the disease white pine blister rust.

In 2011, whitebark pine was added to the list of Federal candidate species eligible for Endangered Species Act protection due to the high magnitude of threats. There is currently no known way to stop white pine blister rust or the mountain pine beetle from infecting trees (Figure 1). Progress has been made in development of more disease resistant trees. Over 100 Select trees have been designated on the Deschutes National Forest. These trees have had cones collected from them and are under blister rust screening at Dorena Genetic Resource Center.

In addition to the Select trees, 75 permanent monitoring plots have been installed in whitebark pine stands in the central Cascades. These monitoring plots are used to assess the overall health of the population.

Whitebark pine has a co-evolved dependence on the native bird, Clark's nutcracker and wildfire. The tree is dependent on the bird to disperse its large wingless seeds, and the nutcrackers utilize fresh whitebark pine seeds and cache thousands of seeds for later use (Keane et al 2012). Forgotten caches grow to create new whitebark pine trees. The exclusion of wildfire has led to the successional replacement of whitebark pine with late seral species on some more productive sites (Keane et al 2012). Whitebark pine are more fire resistant than some high elevation conifers and can withstand low intensity fire (Bower, 2014). Fires create a complex pattern on the ground and good caching habitat for Clark's nutcrackers. Post-fire areas provide better growing conditions for whitebark regeneration by removing competitors (Keane et al 2012). Fire regimes in whitebark pine forests are complex and variable and include a mixture of severities.

Recommendations to help sustain whitebark pine include: 1) Reducing the impacts of disturbances with proactive measures to reduce the risk of blister rust, mountain pine beetle, and wildfire on whitebark pine forests. This may include pruning branches with cankers, spraying fungicide or insecticide, thinning, and treating fuels around rust-resistant trees to reduce wildfire-caused mortality; 2) Protecting rust-resistant seed sources from future mortality caused by disturbance, climate change, and competition; and 3) Implementing treatments to create conditions that encourage whitebark pine regeneration, conserve seed sources, and promote rust resistance. This includes creating nutcracker caching habitat, reducing competing vegetation, and decreasing surface and canopy fuels using direct or indirect treatments, manipulating forest composition, and diversifying age-class structure (Keane et al 2012).

Project design features and mitigation measures to protect botanical resources are found in the *Resource Protection Measures Common to All Action Alternatives* section of this environmental assessment.

Analysis Issues and Measures

The alternatives have the potential to impact Botanical resources.

- *Probability of detrimental impacts to plants as estimated by amount and degree of ground disturbance (acres).*
- *Potential for detrimental or beneficial effects to plants from wildfire or prescribed fire as measured by amount and risk (acres).*
- *Risk of invasive plant spread as estimated by amount and degree of ground disturbance (acres).*

Alternative 1- Ecological trends

There is no probability of direct effects to Sensitive plant species because no known populations or habitat were found in the project area. Indirect effects include an increased probability of potential damage to whitebark pine adjacent to the project area if a wildfire damages the seed trees. There is also a slightly higher probability of continued damage to whitebark pine from mountain pine beetles transferring hosts from lodgepole to whitebark pine. Fire risk and probability is discussed in the Fuels section. This probability is higher in Alternative 1 than in Alternative 2 or 3.

Alternative 2 - Direct and Indirect Effects

Alternative 2 has a low probability of direct effects to Sensitive plant species because no known populations or habitat were found in the project area. Beneficial indirect effects include the decreased probability of disturbance and potential fire damage to whitebark pine seed trees adjacent to the project area if a wildfire burns in the area. Reducing ladder fuels and adding gaps of young regeneration could help lower fire intensity. Fire risk and probability is discussed in the Fuels section. Fire risk is lowest in Alternative 2 because the most fuels reduction and thinning occurs.

Actions which benefit lodgepole pine and reduce its susceptibility to mountain pine beetle can also indirectly benefit whitebark pine. Mountain pine beetle can attack and kill whitebark pine in the transition zone between mid- to higher elevation forest types (Bower 2014). Much of the lodgepole forest in the area is dying or dead and at the end of its lifespan. Actions in the Lodgepole Pine Improvement Area (249 acres) to remove weakened trees and create patches to be planted with young trees as part of a fuel break will remove weakened and diseased older lodgepole which are most susceptible to mountain pine beetle and help stabilize beetle population levels. Mountain pine beetle generally attack larger/older lodgepole pine trees (Eglitis 2014).

Alternative 2 - Cumulative Effects-

This analysis considers the cumulative effects to whitebark pine within Whychus watershed (specifically the Headwaters, Upper, and Middle Whychus, Deep Canyon, Snow Creek Ditch, and Three Creek subwatersheds) over the past 100 years to 10 years into the future. This analysis area was chosen because it is where most of the whitebark population occurs on Sisters Ranger District.

The effects being considered are: potential for detrimental or beneficial effects from thinning, prescribed fire or wildfire as measured by amount and risk. Past management which has affected whitebark pine in the cumulative effects analysis area over the past 100 years includes: timber harvest, fuels reduction, grazing, fire exclusion, fire suppression actions, prescribed fires, and road construction.

Fire exclusion and suppression since the early 1900's have negatively affected whitebark pine because of the decline of open early seral habitats for seed caching by the Clarks nutcracker and tree regeneration from forgotten caches. Wildfires, under the influence of fire exclusion and suppression have burned 25% (45,319 acres) of the Whychus watershed since 1998 (USFS 2013). Wildfires such as the 2012 Pole creek fire burned whitebark pine habitat and had both positive and negative effects to whitebark pine as described above. Approximately 5,000 acres of whitebark habitat burned at varying intensities in the Pole creek fire with both positive and negative effects to the tree species. Approximately 40 acres of the Pole Creek fire area were planted with disease resistant whitebark pine seedlings to help compensate for impacts to seed trees from the fire.

Cattle and sheep grazing from the 1880s to about 1980 may have reduced vegetative and reproductive vigor within this species in the analysis area and caused short term compaction which reduced soil moisture infiltration. Cattle and sheep grazing occurred in high elevation forests and wilderness areas until approximately 30 years ago.

Past timber harvest, firewood cutting and road construction may have directly or indirectly damaged whitebark pine in the higher elevations of the watershed by destroying or injuring trees or compacting soils. Soil disturbance from machinery may have also created open areas for seed caching. Recent Forest Service activities within the lower elevations of cumulative effects

analysis area are trending to reduce the risk of fire spread into higher elevation forests by thinning trees, reintroducing prescribed fire, and reducing the potential intensity of wildfires that may destroy seed trees.

There are no planned foreseeable future actions in the next 10 years that may affect whitebark in the subwatershed.

Alternative 3 - Direct and Indirect Effects

Alternative 3 has no direct effects to Sensitive plant species because no known populations or habitat were found in the project area. Beneficial indirect are similar but slightly less than Alternative 2 because less fuels reduction and thinning occurs. Fire risk is discussed in the Fuels section.

Alternative 3 - Cumulative Effects

The cumulative effects of Alternative 3 are similar to Alterative 2.

Conclusion:

There are no direct effects to sensitive plants under any alternative. There is a potential for indirect effects to whitebark pine from wildfire or mountain pine beetles. This potential is greatest with Alterative 1, and least in Alternative 2, followed by Alterative 3. The cumulative effects to whitebark pine are mixed. The project has beneficial effects and does not add to a negative trend.

Survey and Manage Plant Species

Regulatory Framework/Management Direction

This analysis is prepared in compliance with the Northwest Forest Plan.

Northwest Forest Plan (1994)

The Northwest Forest Plan is a series of federal policies and guidelines governing land use on federal lands in the Pacific Northwest region of the United States. The Plan was developed with the intent of protecting habitat for the northern spotted owl, but came to include much broader habitat protection goals. It creates a network of Riparian Reserves and Late Successional Reserves to conserve and protect habitat and amends the Deschutes National Forest Land and Resource Management Plan (USDA 1990).

Requirements for surveys and management of vascular plants, bryophytes, lichens and fungi apply. Direction is to implement the 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines* (2001 ROD). This is discussed in more detail below.

Project Consistency

The project is consistent with the January 2001 *Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines*. This project utilizes the December 2003 species list. This

list incorporates plant species changes and removals made as a result of the 2001, 2002, and 2003 Annual Species Reviews.

In addition, there are three species receiving special consideration as directed in the May 13, 2014 Regional Forester letter. These species are *Cladonia norvegica*, *Chaenotheca furfuracea*, and *Clavariadelphus truncatus*. We reviewed these species and conducted pre-disturbance surveys for the lichen *Cladonia norvegica* and *Clavariadelphus truncatus*. The species *Chaenotheca furfuracea* does not require surveys but does require management of known sites if they exist. No known sites for this species are found in the project area.

Details of the project surveys, site management and compliance with Survey and Manage Guidelines is discussed below and detailed in Appendix B and in Table **Error! Reference source not found.**.

Pechman Exemptions

The Melvin Butte Vegetation Management Project applies two exemptions from a stipulation entered by the court in litigation regarding Survey and Manage species and the 2004 Record of Decision related to Survey and Manage Mitigation Measure in *Northwest Ecosystem Alliance v. Rey*, No. 04-844-MJP (W.D. Wash., Oct. 10, 2006). Previously, in 2006, the District Court (Judge Pechman) invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations.

Following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain categories of activities from the Survey and Manage standards and guidelines, including both pre-disturbance surveys and known site management. Also known as the "Pechman Exemptions", the Court's Order from October 11, 2006 directs:

"Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applied unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:

a. Thinning projects in stands younger than 80 years old:

b. Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;

c. Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement large wood, channel and floodplain reconstruction, or removal of channel diversions; and

d. The portions of project involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging

will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph."

Exemptions Utilized

Two of the Pechman Exemptions (a & d.) were applied to specific stand types in the project area: plantations and late successional old growth (LSOG). The exemptions allow these areas to be treated without pre-disturbance surveys (Table 1).

For more information about why plantations were proposed for treatment see the Forest vegetation section. For more information about why late successional old growth (LSOG) were proposed for treatment see the Fire and Fuels section. The project meets the Pechman Exemptions as described below:

Table 1 Consistency with the Pechman Exemptions in the Melvin Butte Project area.

Pechman Exemptions as applied in the Melvin Vegetation Management Project		
Exemption	**Where applied/Number of acres**	**How applied**
a. Thinning projects in stands younger than 80 years old	Plantations – Thinning prescription 1,174 acres. Units 58-111 and 115.	Plantation between ages of 23-34 years old will be thinned. Plantations were surveyed for invasive species only.
d. The portions of project involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph."	Prescribed Fire /Fuels treatments Prescription 808.4 acres. Units 1-10, 12-15 and 17.	Late successional forest areas are slated for fire/fuels treatments including pre-commercial thinning and prescribed fire. Pre-disturbance surveys are not required.

Analysis Methods

Analysis of the project included a pre field review of existing information on Survey and Manage plants and their habitats and surveys where required. The direct and indirect effects of the action alternatives are evaluated and the cumulative effects of the project, considered with other activities in the past or near future are also discussed.

Measures to be used in the effects analysis include probability of detrimental impacts to Survey and Manage plant species in number of plants affected and acres of habitat lost or gained. Expected impacts from the project are based on professional knowledge and experience of similar projects in the past.

Prefield Review: The lichen, *Cladonia norvegica* has a known site along Snow Creek, 1 mile west of the project area. Several bryophytes and vascular plants had potential habitat. In

addition 64 fungi species were identified which could have potential habitat in old growth areas. See Appendix B.

Survey Results: Surveys for Category A and non-fungi Category B Survey and Manage species were completed in 2007. Two years of surveys for Fungi on the Survey and Manage List as a Category B species were completed in 2011 and 2012 according to protocol. These species require surveys if old growth habitat will be disturbed. No Survey and Manage species were found in the project area. The species, *Clavariadelphus truncatus* was surveyed for in fungi surveys and was not found.

Surveys for *Cladonia norvegica* were completed in 2011and 2012 on 1,241 acres of old growth habitats, as part of the larger Popper Vegetation Management Project which burned in the 2012 Pole Creek Fire. The unburned portion of the Popper project was modified to create the Melvin Vegetation Management Project. A few suspect lichens were found outside the Melvin project area near the wilderness boundary, however, these sites burned that year in the Pole Creek fire and the plants habitat, old decomposing down logs, were lost before they could be confirmed. No *Cladonia norvegica* was found in the Melvin Butte Project area.

Effects Analysis

Alternative 1- Ecological trends

No known populations or habitat for Survey and Manage species were found or known to exist in the project area.

Alternative 2 and Alternative 3 - Direct and Indirect Effects

There are no known direct or indirect effects to Survey and Manage plant species (see Appendix A) because no known sites exist in the project area and no populations or habitat were found in areas that were surveyed to protocol in the project area.

Hazardous fuel treatments, using prescribed fire for noncommercial treatments, would be conducted on about 540 acres of late successional old growth. This treatment is exempt from survey and management requirements per Pechman exemption (d) (see discussion above). The exemption allows for ladder fuels less than 8 inches diameter at breast height to be cut, if necessary, and the area prescribed burned. Pre-disturbance surveys are not required. No survey and manage species or probable habitat is known from the area.

Additionally, about 1,174 acres of plantations planted from 1981-1993 (ranging from 23 – 35 years old) would be thinned using a variable density prescription. Stands less than 80 years old are exempt from pre-disturbance surveys under the Pechman exemption (a). No survey and manage species or probable habitat is known from the area.

Alternative 2 and Alternative 3 - Cumulative Effects

There are no cumulative effects to Survey and Manage plant species because there are no effects to Survey and Manage species.

Conclusion

There are no direct, indirect or cumulative effects to Survey and Manage plant species under any alternative because no known populations or habitat were found in areas surveyed to protocol in the project area.

Invasive Plant Species

Regulatory Framework/Management Direction

Forest Service Manual (FSM) direction requires that an Invasive Plant (formerly called noxious weeds) Risk Assessments be prepared for all projects involving ground-disturbing activities. For projects that have a moderate to high risk of introducing or spreading invasive plants, Forest Service policy requires that decision documents must identify control measures that will be undertaken during project implementation (FSM 2081.03, 29 November 1995).

This analysis is tiered to a broader scale analysis, the Pacific Northwest Region Final Environmental Impact Statement for the Invasive Plant Program (USFS 2005). The associated Record of Decision amended the Deschutes National Forest Plan by adding management direction relative to prevention and treatment of invasive plants. The Deschutes and Ochoco National Forest Invasive Plant Treatments Environmental Impact Statement (USFS 2012a) also applies to the project area in approving treatments to existing invasive plant populations in the project area, and providing a process (Early Detection Rapid Response) for allowing new infestations to be controlled.

Invasive plants are identified from the Deschutes National Forest Invasive Plant List (See Appendix B). Effects of the activities of the project on the introduction, spread and enhancement of invasive plant populations and required mitigation measures for projects that have a moderate to high risk of introducing or spreading invasive plants (FSM 2081.03, 1995) are addressed in the Invasive plant Risk Assessment section of this document.

Analysis Methods

Risk factors and vectors are considered in determining the level of potential harm in the introduction or spread of invasive plants. The direct and indirect effects of the action alternatives are evaluated and the cumulative effects of the project, considered with other activities in the past or near future, are also discussed.

Prefield Review: Analysis of the project included a pre field review of existing information on invasive plants. The area has been surveyed several times in the past 20 years and existing information was available for spatial analysis using Geographic Information Systems (GIS).

Survey Results: The area was surveyed in 2007 and portions were reexamined in 2011 and 2012. No invasive species were found in the project area.

Invasive Plant Species Risk Assessment: Forest Service Manual direction requires that Invasive plants Risk Assessments be prepared for all projects involving ground-disturbing

activities. For projects that have a moderate to high risk of introducing or spreading invasive plants, Forest Service policy requires that decision documents must identify invasive plants control measures that will be undertaken during project implementation.

Risk Ranking

Deschutes National Forest has developed a standardized invasive plants risk assessment process to be conducted as a part of the project planning process. Risk rankings are based on the following sets of criteria.

High Risk results if (all 3):

1. Known invasive plants in or adjacent to project area. YES on lower portions of access routes
2. Any of vector #s 1-8 in project area. YES
3. And Project operations in or adjacent to invasive plant sites. NO

Moderate Risk results if:

1. Any of vector #s 1-5 are present in project area. YES

Low Risk results if:

1. Any of vector #s 6-8 present in project area,
2. OR
3. Known invasive plants present in or adjacent to project area, even if vectors lacking.

Vectors ranked in order of invasive plant introduction/spread risk:

1. Heavy equipment (implied ground disturbance). YES
2. Importing soil/cinders/gravel. NO
3. Use by OHVs. YES
4. Grazing (long-term disturbance). NO
5. Pack animals (short-term disturbance) NO
6. Plant restoration. NO
7. Use by recreationists. YES
8. Presence of USFS project vehicles. YES

Using this system of analysis, the risk of introduction and spread of invasive plants due to the implementation of this project has been determined to be **MODERATE**. This rating is attributable to the presence of weed populations and vectors. Mitigation measures are required to reduce this risk.

Existing Condition

Aggressive, non-native, invasive plant species can displace native plant communities causing long-lasting management problems. In displacing native vegetation, invasive plant species can

increase fire hazards, reduce the quality of recreational experiences, poison livestock, and replace wildlife forage. By simplifying complex plant communities, invasive plants reduce biological diversity and threaten rare habitats.

There are no known populations of invasive plants in the project area, however, invasive plants such as diffuse and spotted knapweed are known within the subwatersheds adjacent to the project and on lower portions of major roads such as Rd 16. Control efforts are ongoing through the Forest Invasive Plant Program and manual control is occurring at these sites to hand pull plants before flowering occurs. Invasive species can spread into forest areas along roads and can be introduced by vehicles and equipment. There is a moderate risk of introduction and spread from activities which open forest canopies, use prescribed fire, and utilize heavy equipment without mitigation.

Effects Analysis

Alternative 1- Direct and Indirect Effects

Under the No action alternative the risk of Invasive Plant introduction is likely to continue as motorized use and some minor recreation use in the area continues (see assessment below). Seeds are spread by vehicles, wildlife, wind and water movement. Peoples clothing and shoes can also act as vectors which spread invasive plant seeds (Mount and Pickering 2009).

Of the three alternatives associated with this project, the No Action Alternative poses the least risk of introducing, exporting, or moving existing weeds about within the project area because of the lack of ground disturbance, fire, and vehicles and the retention of tree canopy/shade.

Alternative 2- Direct and Indirect Effects

Alternative 2 poses the greatest risk of invasive plant introduction and spread because the most acres are treated (4,435 acres) with ground disturbance by heavy equipment and prescribed fire. Of that, 892 acres are treated to create openings which will be more vulnerable to early seral species, including invasive plants, than a thinned forest with more canopy shade. Actions to reduce, but not eliminate this risk, are included in the project Design Criteria/Mitigations section of this document.

Alternative 2- Cumulative Effects

This analysis considers the cumulative effects of invasive species risk within Whychus watershed (specifically the Headwaters, Upper, and Middle Whychus, Deep Canyon, Snow Creek Ditch, and Three Creek subwatersheds) over the past 100 years to 10 years into the future. This analysis area was chosen because invasive species disperse by a number of agents but the most relevant project related cumulative effects for invasive species expansion and its impacts on rare and riparian habitats is concentrated in these subwatersheds. The effect being considered is the increased risk of invasive plant introduction and spread.

Past management which has affected invasive plant risk in the cumulative effects analysis area over the past 100 years includes: timber harvest, livestock use, fire suppression, wildfires, recreation, utility line installations, development on private lands, and trail and road use and

construction. There are over 2,785 acres of land with invasive species in the cumulative effects analysis area. With the knapweed species, both species are often found in the same areas and these acres are double counted. Densities vary and populations are generally light and widely scattered with some areas of higher concentrations.

The heaviest concentrations of invasive plant populations are associated with areas of past timber harvest (Upper Whychus) and with the irrigation district system (Middle Whychus) or associated with the urban interface (Deep Canyon, Middle Whychus). Table 2 displays invasive plants found in the cumulative effects area.

Table 2 Invasive plants in the Melvin Butte cumulative effects analysis area.

Invasive Species in the Melvin Butte Cumulative Effects Analysis Area		
Species	*Subwatershed*	*Acres*
Diffuse knapweed	Deep Canyon	177
	Middle Whychus	611
	Upper Whychus	790
	Headwaters	1
	TOTAL	**1579**
Spotted knapweed	Deep Canyon	25
	Middle Whychus	416
	Upper Whychus	721
	TOTAL	**1162**
Tansy Ragwort	Upper Whychus	32
	TOTAL	**32**
Canada Thistle	Upper Whychus	12
	TOTAL	**12**
TOTAL		**2,785**

Invasive plant populations are expanding in the subwatershed on public and private lands stimulated by timber harvest, grazing, wildfires, prescribed fires, and land developments. Two large wildfires since 2010 (Rooster Rock, 6119 acres and Pole Creek, 26,538 acres) created more open conditions in the analysis area and fire suppression may have introduced invasive species. Highest risk areas of these two fires and the Pole Creek Fire salvage (discussed below) are being monitored and new invasive starts removed.

Large scale thinning/fuels reduction projects such as the Highway 20 Project, Black Butte Ranch Fuels Project, and the Glaze Forest Restoration Project have improved habitat conditions for invasive plants with thinning and prescribed fire. Mechanical entries and resultant soil disturbance associated with road repairs, utility installations, have further promoted establishment and spread. Numerous invasive plant sites occur along roadsides and within areas

experiencing moderate to heavy recreational use by vehicles and equestrians which provide additional opportunities for invasive plant introduction and dispersal

Forest Service streamside restoration activities within the cumulative effects analysis area in the past 15 years have begun to improve riparian and forest conditions vulnerable to invasive plant invasion reducing riparian trampling and devegetation, by defining access and closing streamfords at 59 sites along Whychus Creek. Increased management controls in riparian areas, roads and trails, along with revegetation of unneeded roads with native plants would combine with other efforts of streamside and forest restoration in the watershed to cumulatively improve vegetative conditions and native plant habitat quality by restoring habitat and reducing impacts from unmanaged recreation. The Whychus Portal project reduced vehicle access and unmanaged use along Whychus Creek and has reduced invasive plant risk by removing vectors for spread and restoring devegetated areas.

The largest area of invasive plant infestation in the watershed is in the ongoing Whychus Floodplain project which is restoring altered channels and floodplain of Whychus Creek to their historic function. About 11,000 plants of diffuse and spotted knapweed (*Centaurea diffusa* and *Centaurea stoebe*) were found scattered over 81 sites in the Whychus Floodplain project area. Intensive management by hand removal has occurred yearly for the past decade on a portion of these populations. New populations were discovered in 2011. The ground disturbance involved with the restoration includes: digging channels and filling areas and increases some habitats likely to be invaded by invasive plants (like new floodplain) while reducing others (such as eroding streambanks). The project will reduce actively eroding streambanks (from 75% to 10%) and thus reduce vulnerable habitats next to the creek. Active revegetation of 34 acres will also reduce invasive plant habitat. Riparian vegetation will increase from 18 acres to 42 acres, however 24 acres of reconnected floodplain will be more vulnerable as seeds are a carried across the floodplain. These effects add to the effects of other watershed restoration projects in the creek channels area upstream and downstream and restore hydrological function to benefit native plants and reduce disturbed habitats for invasives but also provide new ways for seeds to be carried.

Climate change is expected to affect invasive species in the future. A comprehensive review (Vose, et.al 2012) concluded that invasive species will likely become more widespread, especially in areas of disturbance and in dry forest ecosystems. Vose notes that plant invasions can be influenced by warmer temperatures, earlier springs and earlier snowmelt, reduced snowpack, changes in fire regimes, elevated nitrogen deposition, and elevated carbon dioxide concentrations. Invasive species common to the Sisters Ranger District, such as spotted and diffuse knapweeds (*Centurea* spp.), Canada thistle (*Cirsium arvense*), and cheatgrass (*Bromus tectorum*) showed increased productivity in response to elevated carbon dioxide under controlled conditions. Risk of exotic invasive plants entering forests is likely highest in mountainous ecosystems, such as the cumulative effects analysis area, where historically cooler temperatures and closed-canopy forests may have limited invasives.

Funding, monitoring, and control efforts for invasive plants have increased over the past decade with the designation of the Collaborative Forest Landscape Restoration Act area for the Whychus watershed. Fewer plants are being allowed to produce seed. As stream flows are incrementally restored, less habitat would be available for invasive plants. If the mitigation measures are followed the invasive populations should stabilize or be reduced.

Other ongoing and foreseeable actions in the next 10 years that may affect invasive species risk in the subwatershed include 1) Continuation of the Sisters Area Fuels Reduction (SAFR) project and the Pole Creek Salvage project will create ground disturbance and open conditions favorable for invasive plant spread over 18,000 acres , 2) The Travel Management Plan, will reduce vehicle access and reduce risk of invasive plant spread and 3) Invasive plant control on public lands through the Deschutes/Ochoco Invasive Plant program, which will reduce invasive plant species abundance and the risk of spread.

Considered as a whole, the factors which most influences invasive plant spread in the analysis area are vectors that spread invasive plants in vulnerable habitats such as open canopied forests and disturbed soil. The project will add incrementally to the risk of invasive plant populations being introduced to new areas. The project will cause a cumulative increase in the risk of invasive plant populations expanding in the subwatersheds as equipment and project vehicles enter 4,435 acres of land. This risk can be partly mitigated but increased monitoring and control efforts will be needed.

Alternative 3 - Direct and Indirect Effects

Alternative 3 poses the second greatest risk of invasive plant introduction and spread because areas treated (4,364 acres) with ground disturbance by heavy equipment and prescribed fire will be vulnerable to early seral species, such as invasive plants. It is slightly less of a risk than Alterative 2 because there are no openings or temporary roads created. Actions to reduce, but not eliminate this risk, are included in the project Design Criteria/Mitigations section of this document.

Cumulative Effects

The cumulative effects of Alternative 3 are similar to Alternative 2- see discussion above.

Conclusion

There is an increased risk of invasive plant introduction and spread under all Alternatives. This risk is highest in Alternative 2, followed by Alternative 3, and then Alternative 1. The project adds incrementally to the cumulative increase in invasive species risk from past practices, wildfire, and ongoing projects. Actions to reduce, but not eliminate this risk, are included in the project Design Criteria/Mitigations section of this document.

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APPENDIX A

Pre-field review summary of Deschutes Forest Sensitive Plant List for the project area

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Agoseris elata (vascular plant)	Washington and Oregon Cascades	Forest openings and forest edges adjacent to wet/moist meadows, lakes, rivers, and streams	Yes/Yes	Low; little suitable habitat
Alpova alexsmithii (fungus) *	Cascades, Central OR to WA	Associated with various Pinaceae sp., incl. Pacific silver fir, lodgepole, Engelmann spruce, and mountain hemlock	Yes/Yes	None; no suitable habitat
Anastrophyllum minutum *(liverwort)*	Circumboreal	Typically associated with other bryophytes in tight mats on ledges or at the base of cliffs in the mountain hemlock zone	No/No	None; no suitable habitat
Anthelia julacea *(liverwort)*	Northern hemisphere in boreal and montane regions, found at Diamond Peak/Yoran Lake area of Crescent RD	Found on peaty soil in subalpine/alpine habitats above 5,000 ft. Grows on wet crags, streamsides and areas where snow lies late in the year. In Oregon often associated with low ericaceous shrubs	No/Yes	None; no suitable habitat
Arabis suffrutescens var. *horizontalis* (vascular plant)	South-Central Oregon	Meadows, woods, summits, ridges, and exposed rock outcrops	No/No	None; no suitable habitat
Arnica viscosa (vascular plant)	South-Central Oregon Cascades, California	Scree, talus gullies, lava flows and slopes w/ seasonal runoff. May be in moraine lake basins or crater lake basins	No/Yes	None; no suitable habitat
Astragalus peckii (vascular plant)	South-Central Oregon	Basins, benches, gentle slopes, and meadows.	Yes /Yes	None; no suitable habitat
Barbilophozia lycopodiooides (liverwort) *	Circumboreal, south to Oregon and Idaho	High elevation peaks, peaty soil	No/No	None; no suitable habitat
Botrychium pumicola (vascular plant)	Central Oregon	Alpine-subalpine ridges, slopes, and meadows. Lodgepole forests in basins with frost pockets, pumice flats	Yes/Yes	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Brachydontium olympicum (moss) *	Alaska through Oregon, Cascade Mountains	Subalpine to alpine boulder fields, moraines and cliff faces	No/No	None; no suitable habitat
Calamagrostis breweri (vascular plant)	Oregon North Cascades and California	Non-forest moist-to-dry subalpine and alpine meadows, open slopes, streambanks, lake margins	No/No	None; no suitable habitat
Carex abrupta (vascular plant) *	Oregon, California, Nevada	Moist meadows and stream banks at moderate to high elevations	No/No	None; no suitable habitat
Carex capitata (vascular plant) *	Circumboreal	Wet meadows, fens and bogs	Yes /Yes	None; no suitable habitat
Carex diandra (vascular plant) *	Circumboreal, south to California	Swamps, sphagnum bogs, lake margins	No/No	None; no suitable habitat
Carex lasiocarpa var. Americana (vascular plant) *	S Cascades of Washington, Idaho, Montana, Utah, irregularly to Oregon	Mid elevation swamps and wet meadows	No/Yes	None; no suitable habitat
Carex livida (vascular plant)	Oregon Washington, California, Idaho	In peatlands, including fens and bogs; wet meadows with still or channeled water	No/No	None; no suitable habitat
Carex retrorsa (vascular plant) *	Nevada, Oregon, Washington, Idaho, to the north and east	Bogs, swamps, wet meadows, stream margins	No/No	None; no suitable habitat
Carex vernacula (vascular plant) *	Washington, Oregon, California, Idaho	Alpine, moist meadows, open slopes	No/No	None; no suitable habitat
Castilleja chlorotica (vascular plant)	Oregon east Cascades	LP-PP, mixed conifer forest openings. PP at lower and LP at mid, and mixed conifer at highest elevations	No/Yes	Moderate; somel suitable habitat
Cephaloziella spinigera (liverwort)	Widespread around the northern hemisphere in boreal and montane regions	Bogs and fens; boreal and montane. Known from Fremont/Winema National Forest. In moss-dominated communities.	No/no	None; no suitable habitat
Cheilanthes feei (vascular plant) *	Widespread western states, barely in Oregon	Limestone rocky areas	No/No	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Chyloscyphus gimmiparis (liverwort) *	Oregon, Alaska, Utah	High elevation montane streams, aquatic	No/No	None; no suitable habitat
Collomia mazama (vascular plant)	South-Central Cascades, Oregon	Meadows (dry to wet, level to sloping); stream banks and bars, lakeshores and vernal pool margins; forest edges and openings; alpine slopes	No /No	None; no suitable habitat
Conostomum tetragonum (moss) *	Circumboreal; from BC through California	Subalpine to alpine boulder fields, moraines, and cliff ledges	No/No	None; no suitable habitat
Cyperus acuminatus (vascular plant) *	Western states, west cascades Oregon	Margins wet areas, lake edges	No/Yes	None; no suitable habitat
Cyperus lupulinus ssp.*lupulinus* (vascular plant) *	Idaho, Eastern Washington, Oregon	Rocky slopes adjacent to streams, low elevation	No/No	None; no suitable habitat
**Dermatocarpon luridum* (lichen)	Oregon, Washington	On rocks or bedrock in streams or seeps, usually submerged or inundated for most of the year	No/No	None; no suitable habitat
Elatine brachysperma (vascular plant) *	Washington, Oregon, California, Nevada	Wet to drying muds	No/No	None; no suitable habitat
Encalypta brevipes *(moss)*	Circumboreal, British Columbia to Oregon. Known from Rogue River/Siskiyou National Forest.	In soil on cliff ledges/ crevices; sites may have frequent fog penetration; apparently restricted to unglaciated regions; +/- Associated with Pacific silver fir, subalpine fir, and mountain hemlock communities	No/No	None; no suitable habitat
Entosthodon fascicularis *(moss)*	British Columbia, Idaho, Washington, Oregon, California (Arizona, Europe, North Africa.	Grassland, oak savanna, grassy balds and rock outcrops. Individual plants / small patches on seasonally wet, exposed soil in seeps/ intermittent streams.	No/No	None; no suitable habitat
Eucephalus gormanii (vascular plant)	Northern West Cascades	Subalpine to alpine; Rocky ridges, outcrops, or rocky slopes	No/Yes	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Gastroboletus vividus (fungus)	Rogue River N.F., Crater Lake NP, CA	Associated with the roots of Pinaceae sp. such as Shasta red fir and mountain hemlock	No/No	None; no suitable habitat
Gentiana newberryi var. *newberryi* (vascular plant) *	Oregon east and west Cascades, California	Wet to dry alpine, subalpine, and mountain mixed conifer zones, in forest openings and meadows, commonly with tufted hairgrass	Yes/Yes	None; no suitable habitat
Haplomitrium hookeri *(liverwort)*	Widespread but irregularly distributed over temperate and boreal regions, northern and southern hemispheres, Linton Meadows Three Sisters wilderness	On soil in open areas, intermixed with other liverworts and hornworts.	Yes/No	None; no suitable habitat
Harpanthus flotovianus (liverwort)	Widespread in the northern hemisphere in boreal and montane regions. In western North America reaching the southern edge of its range in Oregon	Bogs and fens. On Deschutes, at about 5600' in a smallish, low gradient, persistently groundwater-fed community in the Three Sisters Wilderness Area, south of South Sister	No/Yes	None; no suitable habitat
Helodium blandowii (moss) *	Circumboreal, south through Cascades to Sierra Nevada, and through Rockies to Arizona	Montane fens with calcareous groundwater.	No/Yes	None; no suitable habitat
Heliotropium curassavicum (vascular plant) *	Western United States	Alkaline, saline playas, receding ponds and clay soils	No/No	None; no suitable habitat
Helvella crassitunicata (fungus) *	Cascades, central Oregon to northern WA	On soil, along trails in montane regions with sp. such as Pacific silver fir, grand fir, and mountain hemlock	Yes /No	None; no suitable habitat
Hygrophorus caeruleus (fungus) *	Cascades, central Oregon (Jefferson Co.) to central WA	On soil in association with roots of Pinaceae sp. near melting snowbanks	Yes /Yes	Moderate; little suitable habitat
Jungermannii polaris *(liverwort)*	Circumboreal and south to California, found at Diamond Peak/Yoran Lake area of Crescent RD. Also found within Waldo Lake at depths up to 330 ft.	Subalpine to alpine habitats above 5,000 ft. Forms small to sometimes extensive mats over peaty soil on damp ledges and crevices of rocks, sometimes along streams and rivulets, sometimes aquatic.	No/Yes	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
**Leptogium cyanescens* (lichen)	Oregon, Washington	Generally riparian but recently documented in upland settings on vine maple, big leaf maple and Oregon white oak	No/No	None; no suitable habitat
Lipocarpha aristulata (vascular plant) *	Washington, Oregon, California, Idaho	Low elevation streamsides, gravel bars	No/No	None; no suitable habitat
Lobelia dortmanna (vascular plant)	Oregon East Cascades, Washington	Shallow water at margins of lakes, ponds, and rivers or in standing water of bogs and wet meadows	Yes/Yes	None; no suitable habitat
Lophozia gillmanii *(liverwort)*	Widespread around the northern hemisphere in boreal and montane regions, in western North America	Cliffs and ledges; boreal and montane. One Oregon site in wet meadow at 6500'	No/No	None; no suitable habitat
Lycopodiella inundata (vascular plant)	Oregon, Idaho, California, Montana – Circumboreal	Deflation areas in coastal backdunes; montane bogs, including sphagnum bogs; less often wet meadows	No/Yes	None; no suitable habitat
Lycopodium complanatum (vascular plant)	Oregon, Idaho, Washington +	Edges of wet meadows; dry forested midslope with >25% canopy cover	No/No	None; no suitable habitat
Marsupella sparsifolia *(liverwort)*	Polar and alpine regions in Northern Europe and northern North America, South Africa ,New Zealand. Rare in the Pacific Northwest, south to Mt. Hood in Oregon and possibly California.	Alpine exposed sites, occasionally flooded sands, sandy soils along streams or acidic soils in late snow areas. Siliceous	No/No	None; no suitable habitat
Muhlenbergia minutissima (vascular plant) *	Western United States	Thin lava soils, associated with Typha, sedges	No/No	None; no suitable habitat
Nardia japonica *(liverwort)*	In the North Pacific arc from Japan, through Siberia and British Columbia south to Oregon	Subalpine habitats on peaty soil on rock ledges or in rocky meadows	No/No	None; no suitable habitat
Ophioglossum pusillum (vascular plant)	Oregon, Washington, California, Idaho +	Dune deflation plains; marsh edges; vernal ponds and stream terraces in moist meadows	No/No	None; no suitable habitat
Penstemon peckii (vascular plant)	Central Oregon east Cascades	PP openings, open PP forests; mixed conifer openings; recovering fluvial surfaces	Yes/Yes	Moderate; adjacent populations

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Pilularia americana (vascular plant)	Oregon, California +	Alkali and other shallow vernal pools, not recently used stock ponds, reservoir shores	No/No	None; no suitable habitat
Pinus albicaulis *(*vascular plant)	Western US and Canada	Rocky, exposed sites with shallow, well-drained soils. In upper portions of mountain hemlock vegetation series or above, in subalpine parkland.	Yes/Yes	Moderate; adjacent populations
Polytrichum sphaerothecium (moss) *	East Asia-Western North America through Alaska to Oregon; highest Cascade peaks	Subalpine to alpine, forming green to brown sods on igneous rocks in exposed or sheltered sites.	No/No	None; no suitable habitat
Potamogeton diversifolius (vascular plant)	Oregon, Idaho, Nevada, California	Aquatic, pond edges	No/No	None; no suitable habitat
Preissia quadrata *(liverwort)*	Circumboreal in temperate to boreal regions. In western North America extending south to California	On soil with little organic material, often on cliff ledges or in crevices in rocky areas	Yes/No	None; no suitable habitat
Pseudocalliergon trifarium (moss) *	Circumboreal; British Columbia, Alberta, Montana, Oregon	Montane fens, submerged to emergent or on saturated ground, usually in full sunlight	No/No	None; no suitable habitat
**Ramaria amyloidea* (fungus) S&M	Central OR Cascades (Wiliamette and DES NF); WA Cascades, NW CA	Mycorrhizal with true firs, Douglas fir, and western hemlock in humus or soil.	No/Yes	Moderate; some suitable habitat
**Rhizomnium nudum* (bryophyte) S&M	Oregon, Washington +	Moss found in moist coniferous forests. On DNF associates include lodgepole pine, Engelmann spruce, mountain hemlock, and western white pine	No/Yes	Low; little suitable habitat
Rorippa columbiae (vascular plant)	Oregon, California, Washington	Wet to vernally moist sites in meadows, fields, playas, lakeshores, intermittent stream beds, banks of perennial streams, along irrigation ditches, river bars and deltas, roadsides.	No/Yes	None; no suitable habitat
Rotala ramosior (vascular plant) *	Washington, Oregon, California, Idaho	Low elevation low gradient shores, pond edges, river bars	No/No	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Scheuchzeria palustris var. *americana* (vascular plant)	Oregon, Washington, California, Idaho +	Open to canopied bogs, fens, and other wetlands where often in shallow water	Yes/Yes	None; no suitable habitat
Schistidium cinclidodonteum *(moss)*	Washington, Idaho, Oregon, California, Nevada and Europe	In large loose mats on wet or dry rocks / soil in rock crevices, often along intermittent streams. . Ponderosa pine, grand fir, Pacific silver fir, subalpine fir, mountain hemlock and possibly whitebark pine communities.	No/No	None; no suitable habitat
Schistostega pennata (bryophyte) S&M	Oregon, Washington, circumboreal	Mineral soil in crevices on lower and more sheltered parts of root wads of fallen trees near streams or other wet areas	Yes/Yes	None; no suitable habitat
Schofieldia monticola *(liverwort)*	Oregon, Washington, Russia	Subalpine meadows to alpine areas. On peaty soils under heather or beside small streams.	No/No	None; no suitable habitat
Schoenoplectus subterminalis (vascular plant)	Oregon, Washington, California, Idaho +	Generally submerged to emergent in quiet water 2-8 decimeters deep, in peatlands, sedge fens, creeks, ditches, ponds and lakes	No/Yes	None; no suitable habitat
**Scouleria marginata* (bryophyte) S&M	Pacific Northwest endemic; Oregon, Washington, Idaho, northern California, southwestern British Columbia	Exposed or shaded rocks in streams; seasonally submerged or emergent	No/No	None; **no plants or suitable habitat was found during survey**
Splachnum ampullaceum (moss) *	Circumboreal; from Alaska through Oregon, and Alberta	Peatlands, wetlands, on old ungulate dung	No/No	None; no suitable habitat
Texosporium sancti-jacobi (lichen) *	Western North America	In Oregon, late seral dry shrub/grassland	No/No	None; no suitable habitat
Tholurna dissimilis *(lichen)*	Scandinavia, Northwest Territories, Yukon, and British Columbia south into Washington and Oregon. On Black Butte, Sisters District,	- Open Pinus albicaulis stand on moderate slope, with dense understory of shrubs; also open Abies lasiocarpa forest with low stunted trees.	Yes/Yes	None; no suitable habitat
Tomentypnum nitens (moss) *	Circumboreal, Alaska through Oregon	Montane fens at slightly elevated (stumps, logs, hummocks)	Yes/Yes	None; no suitable habitat

R6 Sensitive Plant Species Documented or Suspected on the Deschutes National Forest	Range	Habitat	Known occurrence on Sisters RD? On Forest?	Probability of Occurrence in Project Area
Trematodon boasii (moss)	British Columbia through California, Japan, Newfoundland	Subalpine stream, trail and pond edges.	No/No	None; no suitable habitat
Tritomaria exsectiformis (liverwort)	Alaska through Oregon, to Montana, Wyoming and Colorado	Open to shaded coniferous forest along perennial flowing water from springs and seeps	Yes/Yes	None; no suitable habitat
Utricularia minor (vascular plant) *	Western United states north through Canada	Aquatic plant of pools, ponds, bogs, marshes, wet meadows	Yes/Yes	None; no suitable habitat

Deschutes National Forest
Survey & Manage Botany Checklist and Tracking Form

Project Name: Melvin Butte Forest Management Project

Describe Project Type: Thinning to improve forest heath and reduce fire risk, prescribed fire, road decommissioning.

Prepared By: Maret Pajutee **Date:** September 22, 2014

District: Sisters

Location: Melvin Butte

This is a Survey and Manage (S&M) species checklist and form to track compliance with the 2001 Record of Decision. For each project within the Northwest Forest Plan Area, fill out Sections A-D (Checklist, Tracking Form, Statement of Compliance and Summary of Survey Results). Sign and date the form at the end of this document.

This checklist and format are not intended to replace the effects analysis section of your National Environmental Policy Act (NEPA) document. Include the tracking forms in your project NEPA. If you include the tracking forms as an appendix to the NEPA document, summarize the project's S&M conformance with the 2001 ROD S&Gs in the NEPA document itself. If you have questions or believe your project has a high litigation risk, please work with the S&M Contact for your National Forest/BLM District and the appropriate program leads in your FS Regional or BLM State Office to finalize your tracking forms for greatest accuracy and defensibility.

A. CHECKLIST – complete this checklist for each project within the NW Forest Plan Area.

☒ **Species List:**

☒ 1. For project decisions, check which box, below, applies:

☒ Surveys were completed using: the December 2003 species list (i.e., 2001 Record of Decision species list. with the Annual Species Reviews).

☒ "Special Consideration" was given for the following species suspected or documented to occur on the Deschutes NF

- ☒ Lichen *Cheanotheca furfuracea*
- ☒ Lichen *Cladonia norvegica*
- ☒ Fungus *Clavariadelphus truncatus*

☒ Surveys were not completed (In a subset of the project area) because the project applied one of the four Pechman Exemptions; therefore the project is exempt from Survey &Manage

pre-disturbance surveys and known site management. The following Pechman Exemption was applied:

☒ Thinning forest stands < 80 years old

☐ Culvert replacement/removal

☐ Riparian/stream improvement projects

☒ Hazardous fuel treatments applying prescribed fire for noncommercial projects.

The exemption was applied to plantations less than 80 years old and areas which were slated for fuels reduction, small tree thinning and prescribed fire.

☒ 2. Double check S&M categories and species names for correctness and accuracy.

☒ **Survey Protocols:**

☒ 1. Use survey protocols and any Annual Species Review (ASR) range extensions/contractions to determine if the project is in the species range, has suitable habitat, is a "habitat-disturbing activity" and, hence, needs pre-disturbance surveys.

☒ 2. Identify and list the survey protocols used. Note the survey protocol name in the preceding bullets to Table A.

Fungi- USFS, 2012. Survey & Manage Category B Fungi Equivalent-Effort Survey Protocol, Version 1.0, February 2012

☒ 3. Confirm survey results are entered into the appropriate Agency database.

☒ 4. Confirm forms are in the project record. The survey forms are evidence that surveys were conducted within protocol parameters and demonstrate survey findings.

☒ **Survey Requirements:**

☒ 1. Include the following species in Table A:

a. Category A and C flora species **known or suspected** to occur within the National Forest/BLM District (pre-disturbance surveys).

☒ 2. For habitat-disturbing projects within old-growth forests (2001 ROD S&Gs, pp. 79-80), list the following species in Table A:

☒ Include Category B bryophyte and lichen species **known or suspected** to occur within the National Forest/BLM District (if your project has a Decision in FY06 or later and strategic surveys are not completed for the province that encompasses the project area, then equivalent effort surveys are required in old-growth habitat to be disturbed; 2001 ROD S&G, p. 9). Do not list the 8 lichen and bryophyte species where strategic surveys are considered complete. See IM-2006-38 for further information about these species and about Equivalent Effort surveys.

☒ Include Category B fungi species **known or suspected** to occur within the National Forest/BLM District if your project has a Decision in FY11 or later (if your project has a

Decision in FY06 or later and strategic surveys are not completed for the province that encompasses the project area, then equivalent effort surveys are required in old-growth habitat to be disturbed; 2001 ROD S&G, p. 9).

☒ 3. Although you are listing all <u>species with pre-disturbance and equivalent effort survey requirements</u> that are **known or suspected** within your National Forest/BLM District, Table A should reflect how the species information is applied to the [PROJECT] specifically. For instance, some of the species may be known or suspected within your National forest/BLM District, but the project may not be within the range of the species, and therefore the species is not known or suspected within the specific project.

☒ 4. Review consistency of responses in consecutive columns of Table A for a given species. If a project is not within the range of the species, you can't have suitable habitat in the project (i.e. doesn't make sense to put "No" in the first column for "within range of the species" and then have "Yes" in second column for "project contains suitable habitat").

☒ **Known Site Management:**

☒ 1. Include in Table A any species with **known sites that** occur **within the project area**.

☐ Indicate what site management the unit implemented and what information the National Forest/BLM District utilized in determining appropriate site management (management recommendations, conservation assessments, species fact sheets, Appendix J-2, etc.). Be specific when describing exact management applied; for example, "placed a 100 ft. no-activity area around the site (source citation)."

☒ 2. For Category D and E species, only the "Sites Known or Found" and "Site Management" sections of Table A need to be filled out (all other fields should be N/A).

☐ Indicate what site management the unit implemented and what information the National Forest/BLM District utilized in determining appropriate site management (management recommendations, conservation assessments, species fact sheets, Appendix J-2, etc.). Be specific when describing exact management applied; for example, "placed a 100 ft. no-activity area around the site (source citation)."

☒ 3. For species not requiring site management (non-high priority sites, occasional site of a rare species not needed for persistence, Category F species), indicate that site management is not required and why.

(Note: While a "yes/no/NA" answer is sufficient in the column titled "Site Management" for Table A, provide the more detailed information identified above in 1-3 in either a footnote to Table A or the Statement of Compliance-Summary of Survey Results section at the end of the form.)

☒ **Information Regarding Unique Circumstances:**

Use the footnotes section of Table A for information that describes unique circumstances in your National Forest/BLM District or for further clarification. Don't use them to restate something that is already clear from the table. For example, it may be helpful to more completely explain that the range of the species bi-sects the National Forest/BLM District and the specific project is outside the range.

☒ **Final Statement of Compliance:**

Include a summary in the Statement of Compliance to include identification of:

☒ 1. Species list applied 2003

☒ 2. Species surveyed: See Table A

☒ 3. Species found or with known sites in the project area NONE

☒ 4. Information demonstrating application of management recommendations

Survey Protocols Used:

Equivalent effort FUNGI- USFS, 2012. Survey & Manage Category B Fungi Equivalent-Effort Survey Protocol, Version 1.0, February 2012.
http://www.blm.gov/or/plans/surveyandmanage/files/sp-fu-catB-equiv-effort-2012.pdf

Cladonia norvegica- Supplemental Guidance for Pre-Disturbance Surveys Under the Northwest Forest Plan Survey and Manage Standard and Guidelines *Cladonia norvegica*, USDA Forest Service Regions 5 and 6, USDI Bureau of Land Management, Oregon and California, September 2012.
http://www.blm.gov/or/plans/surveyandmanage/files/sp-li-cladonia-norvegica-enc.pdf

- Identify the management recommendation or other information utilized.
- Clearly describe on-the-ground application of known site management. What management/protective measures were specifically applied to provide for the persistence of the species at the known site.

Botany Species Survey and Site Management Summary

B. TRACKING FORM – Use this form to track compliance with surveys and known site management.

The Deschutes National Forest compiled the species listed below (**Table A**) from the 2001 Record of Decision. This list includes those vascular and non-vascular plant species with pre-disturbance survey requirements (Category A or C species), whose known or suspected range includes the Deschutes National Forest according to the references listed in **Appendix B.**

IF YOUR PROJECT IS A HABITAT-DISTURBING ACTIVITY IN OLD GROWTH, KEEP THIS SECTION: This list also includes species with Equivalent Effort pre-disturbance survey requirements, including Category B lichen and bryophytes and Category B fungi species whose known or suspected range includes the Deschutes National Forest according to the references listed in **Appendix A**.

All other survey and manage species that are on the 2011 Settlement Agreement list but are not included in Table A, are not known or suspected to occur on the Deschutes NF either because the Forest is outside the known or expected range of the species or the Forest does not contain suitable habitat for the species.

Equivalent effort surveys are not required for this project for Category B lichen, bryophyte and fungi species because:

___ Old growth habitat does not occur with the project area

_X_ Old growth habitat occurs but the project will not cause a significant negative impact on species' habitat, life cycle, microclimate, or life support requirement.

***Explanation*: The old growth to be affected in the project area falls under the Pechman Exemption for fuel reduction. Thinning small trees under 8" dbh and prescribed fire would be used.**

Table A identifies Category A, B, C, D, and E species with known sites located within the Project Area. The references listed in **Appendix A** were used to determine appropriate known site management.

Table A. Survey & Manage plant species evaluation for the Melvin Butte Project on the Sisters Ranger District, District, Deschutes National Forest. Species highlighted in yellow need Special Consideration.

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Schistostega pennata	Bryophyte	A[1]	yes	yes	yes	yes	8/07	no	
Leptogium cyanescens	Lichen	A	yes	yes	yes	yes	8/07	no	
Rhizomnium nudum	Bryophyte	B[3]	yes	yes	yes	yes	8/07	no	
Tritomaria exsectiformis	Bryophyte	B[2]	yes	yes	yes	yes	8/07	no	
Calicium abietinum	Lichen	B[3]	yes	no	yes	yes	8/07	no	
Chaenotheca Chrysocephala	Lichen	B[3]	yes	no	yes	yes	8/07	no	
Chaenotheca ferruginea	Lichen	B[3]	yes	no	yes	yes	8/07	no	
Cladonia norvegica	Lichen	B[8]	yes	no	yes	yes	8/07	no	
Dermatocarpon luridum (now called D. meiophyllizum)	Lichen	B[2]	yes	no	yes	yes	8/07	no	
Tholurna dissimilis	Lichen	B[2]	yes	no	yes	yes	8/07	no	
Albatrellus caeruleoporus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Albatrellus ellisii	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Alpova alexsmithii	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Arcangeliella crassa	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Arcangeliella lactarioides	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Boletus pulcherrimus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Choiromyces alveolatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Chroogomphus loculatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Clavariadelphus ligula	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Clavariadelphus occidentalis	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Clavariadelphus sachalinensis	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Clavariadelphus truncatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Cortinarius magnivelatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Cortinarius olympianus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Cortinarius verrucisporus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Cortinarius wiebeae	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Cudonia monticola	Fungus Litter saprobe	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Elaphomyces anthracinus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Elaphomyces subviscidus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Fayodia bishpaerigera	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Fevansia aurantiaca (= Alpova aurantiaca)	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gastroboletus ruber	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gastroboletus subalpinus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gastroboletus turbinatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gastroboletus vividus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gautieria magnicellaris	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gomphus bonarii	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gomphus clavatus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gymnomyces abietis	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Gymnomyces nondistincta	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Gyromitra californica	Fungus Wood/litter saprobel	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Helvella crassitunicata	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Hydnotrya inordata	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Hygrophorus caeruleus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Leucogaster citrinus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Polyozellus multiplex	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria amyloidea	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria aurantiisiccescens	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria botrytis var. aurantiiramosa	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria coulterae	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria largentii	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria maculatipes	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria rubrievanescens	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Ramaria thiersii	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Rhizopogon abietis	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Rhizopogon atroviolaceus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Rhizopogon evadens var. subalpinus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Rhizopogon exiguous	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Rhizopogon flavofibrillosus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Sarcodon fuscoindicus	Fungus Mycorrhizal	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Spathularia flavida	Fungus Litter saprobe	B[2]	yes	yes	yes	yes	6/11, 10/11, 5/12, 10/12	no	
Cypripedium montanum	Vascular	C[4]	yes	yes	yes	yes	8/07		
Chalciporus piperatus	Fungus Mycorrhizal	D[5]	yes	N/A	N/A	No[2]	N/A		
Mycena overholtsii	Fungus Wood saprobel	D[5]	yes	N/A	N/A	No[2]	N/A		
Phaeocollybia attenuata	Fungus Mycorrhizal	D[5]	yes	N/A	N/A	No[2]	N/A		
Ramaria rubripermanens	Fungus Mycorrhizal s	D[5]	yes	N/A	N/A	No[2]	N/A		
Rhizopogon truncatus	Fungus Mycorrhizal	D[5]	yes	N/A	N/A	No[2]	N/A		
Sparassis crispa	Fungus Wood saprobe	D[5]	yes	N/A	N/A	No[2]	N/A		
Tremiscus helvelloides	Fungus Litter saprobe	D[5]	yes	N/A	N/A	No[2]	N/A		

Species	Group	S&M Category	Survey Triggers			Survey Results			Site Management
			Project Within Species Range?	Project Contains Suitable Habitat or Old Growth Forest?	Project Habitat Disturbing?	Surveys Required?	Survey Date (month/year)	Sites Known or Found?	Describe applied management and what information used to determine this management
Chaenotheca subroscida	Lichen	E[6]	yes	N/A	N/A	No[6]	N/A		
Chaenothecopsis pusilla	Lichen	E[6]	yes	N/A	N/A	No[6]	N/A		
Leptogium teretiusculum	Lichen	E[6]	yes	N/A	N/A	No[6]	N/A		
Chaenotheca furfuracea	Lichen	F[7]	yes	N/A	N/A	No[7]	N/A		*Not required to manage known sites but if apply site management, describe:*
Collema nigrescens	Lichen	F[7]	yes	N/A	N/A	No[7]	N/A		*Not required to manage known sites but if apply site management, describe:*
Collybia bakerensis	Fungus Litter saprobe	F[7]	yes	N/A	N/A	No[7]	N/A		*Not required to manage known sites but if apply site management, describe:*
Gomphus clavatus	Fungus Mycorrhizal	F[7]	yes	N/A	N/A	No[7]	N/A		*Not required to manage known sites but if apply site management, describe:*

[1] Pre-disturbance surveys and management of all known sites are required for Category A species

[2] Equivalent effort surveys required if old growth habitat disturbed and manage all known sites (Category B species)

[3] Strategic surveys completed; therefore equivalent effort surveys are **not** required (memo titled, *Category B Lichens and Bryophytes where Strategic Surveys are Considered Complete*, March 24, 2006).

[4] Pre-disturbance surveys and management of high priority sites are required for Category C species

[5] Pre-disturbance surveys are not required for Category D species, but required to manage high priority sites

[6] Pre-disturbance surveys are not required for Category E species, but required to manage all known sites
[7] Pre-disturbance surveys and management of known sites are not required for Category F species
[8] Special Consideration given to this species per Letter of Direction dated May 13, 2014

C. STATEMENT OF COMPLIANCE

The Deschutes National Forest applied the 2003 Survey and Manage Species List (the 2001 Record of Decision Species List with the incorporation of the Annual Species Reviews) to the _____ project, completing pre-disturbance surveys, equivalent effort surveys (if old growth habitat is disturbed) and management of known sites (Table A) required by Survey Protocols and Management Recommendations to comply with the *2001 Record of Decision and Standard and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measure Standards and Guidelines*.

D. SUMMARY OF SURVEY RESULTS

Project surveys discovered sites for the following Survey and Manage plant species:

- NONE

Known sites are present within the project area for these additional species:

- NONE

Maret Pajutee *September 22, 2014*

District Ecologist Date

Survey & Manage Plant References.

General References

Management Recommendations and Survey Protocols are available on the Survey and Manage Program website:

http://www.blm.gov/or/plans/surveyandmanage/protocols/

USDI Bureau of Land Management. 2002. Survey and Manage Management Recommendations for National Fire Plan Activities. Oregon, California and Washington.

Direction Letter:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-fire_amendment-va-li-br-fu-2002-08.pdf

Attachment 1: Survey and Manage Management Recommendations for Fuel Hazard Reduction Treatments Around At-Risk Communities. Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants

http://www.blm.gov/or/plans/surveyandmanage/files/mr-fire_amendment-va-li-br-fu-2002-08-att1.pdf

Survey and Manage Additional Clarifying Questions and Answers about MR Amendments for Fuel Hazard Reduction Treatments around At-Risk Communities, Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-fire_amendment-va-li-br-fu-2002-08-att2.pdf

Bryophytes

USDA Forest Service and USDI Bureau of Land Management. 2002. Survey and Manage Management Recommendations for Fuel Hazard Reduction Treatments Around At-Risk Communities, Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants. Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/MR/Fire-1st-VascPl_Lich_Bryo_Fungi/Attachment_1.pdf

Rhizomnium nudum

Harpel, J.A. and L. Holmberg. 2005. Conservation Assessment for Rhizomnium nudum. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington.

http://www.fs.fed.us/r6/sfpnw/issssp/planning-documents/assessments.shtml

USDA Forest Service and USDA Bureau of Land Management. 1999. Survey Protocols for Protection Buffer Bryophytes, Version 2.0. Section I, Subsection II. Publication IM OR-2000-017. Portland, Oregon.

Direction Letter:

http://www.blm.gov/or/plans/surveyandmanage/files/05-bryophytes_pbsv2.pdf

Document:

http://www.blm.gov/or/plans/surveyandmanage/files/05-bryophytes_pbsv2_enclosed.pdf

USDA Forest Service and USDI Bureau of Land Management. 1998. Management Recommendations for Bryophytes, Version 2.0. Portland, Oregon.

Direction Letters (several due to changes):

November 4, 1996 – Survey & Manage Draft Management Recommendations – Bryophytes:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-1997-01.pdf

September 21, 1999 – A change to Survey & Manage Draft Management Recommendations – Bryophytes:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09.pdf

Document:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09-att1.pdf

Schistostega pennata

Harpel, J.A. and R. Helliwell. 2005. Conservation Assessment for Schistostega pennata. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington.

http://www.fs.fed.us/r6/sfpnw/issssp/planning-documents/assessments.shtml

USDA Forest Service and USDA Bureau of Land Management. 1999. Survey Protocols for Protection Buffer Bryophytes, Version 2. Section I, Subsection II. Publication IM OR-2000-017. Portland, Oregon.

Direction Letters (several due to changes):

November 4, 1996 – Survey & Manage Draft Management Recommendations – Bryophytes:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-1997-01.pdf

September 21, 1999 – A change to Survey & Manage Draft Management Recommendations – Bryophytes:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09.pdf

Document:

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09-att1.pdf

USDA Forest Service and USDA Bureau of Land Management. 1998. Management Recommendations for Bryophytes, Version 2.0. Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09-att1.pdf

USDA Forest Service and USDI Bureau of Land Management. 2002. Survey and Manage Management Recommendations for Fuel Hazard Reduction Treatments Around At-Risk Communities, Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants. Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/MR/Fire-1st-VascPl_Lich_Bryo_Fungi/Attachment_1.pdf

Tritomaria exsectiformis

USDA Forest Service and USDA Bureau of Land Management. 2006. Survey Protocol Guidance for Conducting Equivalent Effort Surveys under the Northwest Forest Plan Survey and Manage Standards and Guidelines. Portland, Oregon.

Direction Letter - Equivalent Effort Surveys for Survey and Manage Category B Species; and Survey Methodology for One Lichen Species with Category Change from 2003 Annual Species Review

http://www.blm.gov/or/plans/surveyandmanage/files/02-equiv_effort_lichen.pdf

Document:

http://www.blm.gov/or/efoia/fy2006/im/p/im-or-2006-038Att1.pdf

Harpel, J.A. and R. Dewey. 2005. Conservation Assessment for Tritomaria exsectiformis. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington.

http://www.fs.fed.us/r6/sfpnw/issssp/planning-documents/assessments.shtml

USDA Forest Service and USDA Bureau of Land Management. 1998. Management Recommendations for Bryophytes, Version 2.0. Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/files/mr-br-chg1-1999-09-att1.pdf

Fungi

Direction letter (October 20, 1997): Survey and Manage Management Recommendations – Fungi.

This letter contains links to Castellano and O'Dell (1997) and to General Guidance for Use of Survey and Manage Management Recommendations
http://www.blm.gov/or/plans/surveyandmanage/files/mr-fu-1997-10.pdf

Direction letter (August 16, 2002): Amendments to Survey and Manage Management Recommendations designed to facilitate certain National Fire Plan activities – Vascular Plants, Lichens, Bryophytes, and Fungi
http://www.blm.gov/or/plans/surveyandmanage/files/mr-fire_amendment-va-li-br-fu-2002-08.pdf

Document:

http://www.blm.gov/or/plans/surveyandmanage/MR/Fire-1st-VascPl_Lich_Bryo_Fungi/Attachment_1.pdf

Castellano, M.A. and T. O'Dell. 1997. Management Recommendations for Survey and Manage Fungi. USDA Bureau of Land Management and USDA Forest Service, Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/MR/Fungi/default.htm

Castellano, M.A., J.E. Smith, T. O'Dell, E. Cazares, and S. Nugent. 1999. Handbook to Strategy 1 Fungal Species in the Northwest Forest Plan. USDA Forest Service Pacific Northwest Research Station, Portland, Oregon. General Technical Report PNW-GTR-476.

http://www.treesearch.fs.fed.us/pubs/2966

Castellano, M.A., E. Cazares, B. Fondrick, and T. Dreisbach. 2003. Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan. USDA Forest Service Pacific Northwest Research Station, Portland, Oregon. General Technical Report PNW-GTR-572.

http://www.fs.fed.us/pnw/pubs/gtr572/

Cushman, K. and R. Huff. 2007. Conservation Assessment for Fungi included in the Forest Service Regions 5 and 6 Sensitive and BLM California, Oregon and Washington Special Status Species Programs. Portland, Oregon.

Appendix 1 = Fungi species currently included in Sensitive species programs

Appendix 2 = Additional Fungi Species

http://www.blm.gov/or/plans/surveyandmanage/files/ca-fu-text-2007-07-10.pdf

Exeter, R. L., L. Norvell, and E. Cazares. 2006. Ramaria of the Pacific Northwestern United States. USDI Bureau of Land Management, Salem, Oregon.

Van Norman, K. and R. Huff. 2012. Survey & Manage Category B Fungi Equivalent Effort Survey Protocol, v. 1.0. Portland, OR. U.S. Department of Interior Bureau of Land Management, Oregon/Washington and U.S. Department of Agriculture, Forest Service, Region 6.

http://www.blm.gov/or/plans/surveyandmanage/files/sp-fu-catB-equivalent-effort-2012-04-11.pdf

Lichens

General Survey Guidelines can be found in:

> Derr, Ch. R. Helliwell, A. Ruchty, L. Hoover, L. Geiser, D. Lebo, and J. Davis. 2003. Survey Protocols for Survey & Manage Category A & C. Lichens in the Northwest Forest Plan Area. Version 2.1. USDA Forest Service and USDI Bureau of Land Management, Portland, Oregon.
>
> http://www.blm.gov/or/plans/surveyandmanage/files/08-lichens_v2-1_enclosed.pdf

McCune, Bruce and Linda Geiser. 2009. Macrolichens of the Pacific Northwest. Oregon State University Press, Corvallis, Oregon.

Dermatocarpon luridum:

> Glavich, D.A. 2007. Conservation Assessment for Dermatocarpon meiophyllizum. USDA Forest Service Region 6 and USDI Bureau of Land Management, Oregon and Washington.
>
> http://www.fs.fed.us/r6/sfpnw/issssp/planning-documents/assessments.shtml
>
> Lesher, R. C.C. Derr, and L.H. Geiser. 2003. Natural History and Management Considerations for Northwest Forest Plan Survey and Manage Lichens Based on Information as of the Year 2000. USDA Forest Service, Pacific Northwest Region, Portland, Oregon. R6-NR-S&M-TP-03-03.

Leptogium teretiusculum

> Martin, E.B. McCune, and J. Hutchinson. 2002. Distribution and Morphological Variation of *Leptogium cellulosum* and *L. teretiusculum* in the Pacific Northwest. The Bryologist, Vol. 105, No. 3, pp. 358-362.

Vascular Plants

USDA Forest Service and USDI Bureau of Land Management. 1998. Management Recommendations for Vascular Plants.

http://www.blm.gov/or/plans/surveyandmanage/MR/VascularPlants/contents.htm

> *Includes Sensitive plants, Botrychium minganense and B. montanum as well as Survey & Manage Cypripedium montanum.*

Survey and Manage Protocols for Vascular Plants:

> Direction Memo (January 20, 1999):

http://www.blm.gov/or/plans/surveyandmanage/files/15-vascular_plants.pdf

Whiteaker, L., J. Henderson, R. Holmes, L. Hoover, R. Lesher, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. Survey Protocols for Survey & Manage Strategy 2 Vascular Plants, v. 2.0. USDA Forest Service and USDI Bureau of Land Management, Portland, Oregon.

USDA Forest Service and USDI Bureau of Land Management. 2002. Survey and Manage Management Recommendations for Fuel Hazard Reduction Treatments Around At-Risk Communities, Group 1 – Certain Fungi, Lichens, Bryophytes, Vascular Plants. Portland, Oregon.

http://www.blm.gov/or/plans/surveyandmanage/MR/Fire-1st-VascPl_Lich_Bryo_Fungi/Attachment_1.pdf

Provides guidance for Cypripedium fasciculatum and Botrychium montanum, which may be applied to other species in these genera.

APPENDIX C

DESCHUTES NATIONAL FOREST NOXIOUS WEED LIST

The following species are listed by the Oregon Department of Agriculture as noxious weeds. These are species designated by the Oregon State Weed Board as injurious to public health, agriculture, recreation, wildlife, or any public or private property.

Scientific Name	Common Name	Presence	Code
Agropyron repens	Quackgrass	Documented	AGRREP
Cardaria (=Lepidium) draba	Whitetop	Potential	CARDRA
Carduus nutans	Musk thistle	Potential	CARNUT
Carduus pycnocephalus	Italian thistle	Potential	CARPYC
Centaurea diffusa	Diffuse knapweed	Documented	CENDIF
Centaurea maculosa	Spotted knapweed	Documented	CENMAC
Centaurea pratensis	Meadow knapweed	Potential	CENPRA
Centaurea repens	Russian knapweed	Potential	CENREP
Centaurea solstitialis	Yellow starthistle	Potential	CENSOL
Centaurea virgata ssp. squarrosa	Squarrose knapweed	Potential	CENVIR
Cirsium arvense	Canada thistle	Documented	CIRARV
Cirsium vulgare	Bull thistle	Documented	CIRVUL
Conium maculatum	Poison hemlock	Potential	CONMAC
Cynoglossum officinale	Common houndstongue	Documented	CYNOFF

Cytisus scoparius	Scotch broom	Documented	CYTSCO
Euphorbia esula	Leafy spurge	Documented	EUPESU
Hypericum perforatum	St. Johnswort	Documented	HYPPER
Isatis tinctoria	Dyer's woad	Documented	ISATIN
Kochia scoparia	Kochia	Potential	KOCSCO
Linaria dalmatica	Dalmation toadflax	Documented	LINDAL
Linaria vulgaris	Butter and eggs	Documented	LINVUL
Lythrum salicaria	Purple loosestrife	Potential	LYTSAL
Onopordum acanthium	Scotch thistle	Documented	ONOACA
Salvia aethiopis	Mediterranean sage	Potential	SALAET
Senecio jacobaea	Tansy ragwort	Documented	SENJAC
Taeniatherum caput-medusae	Medusahead	Documented	TAECAP